Understanding Deep Vein Thrombosis (DVT): What everyone needs to know

Beth Waldron, MA
Program Director, Clot Connect
University of North Carolina at Chapel Hill

CDC Division of Blood Disorders webinar series on bleeding and clotting disorders
March 6, 2014

www.ClotConnect.org
A network of blood vessels

Arteries:
- Carry blood away from the heart—to the extremities (arms, legs, brain and internal organs).
- A blood clot in an artery = stroke, heart attack

Veins:
- Carry blood back to the heart—from the extremities (arms, legs, brain and internal organs).
- A blood clot in a deep vein = deep vein thrombosis (DVT), pulmonary embolism (PE)
What is deep vein thrombosis and pulmonary embolism?

Deep Vein Thrombosis (DVT):
- A blood clot that has formed in a deep vein
- While DVT can occur anywhere in the body, it is most common in the leg.

Pulmonary Embolism (PE):
- A blood clot in the pulmonary vessels (lung)
- PE occurs when a blood clot breaks off from a DVT, travels through the blood stream and lodges in the lung.
- Potentially life-threatening complication of DVT.
DVT and PE

- **300,000 to 600,000** Americans affected annually
- **60,000-100,000** Americans die
  - 10 to 30% die within one month of diagnosis
  - One-half will have long-term complications
  - One-third will have another clot within 10 years

*Statistical source: CDC*
Symptoms

**Pulmonary Embolism (PE)**
- Shortness of breath
- Chest pain (may be worse with deep breath)
- Unexplained cough (may cough up blood)
- Unexplained rapid heart rate

**Deep vein thrombosis (DVT)**
- Pain
- Swelling
- Discoloration (bluish or reddish)
- Warmth

Image: Jeff Harrison
Other conditions mimic symptoms

- Symptoms may range from mild to severe
- Symptoms may also be subtle and easily confused with other medical conditions.
  - DVT may be confused with sprained ankle, ‘Charley horse’, or pulled muscle.
  - PE may be misinterpreted as ‘a touch of pneumonia’, new onset of asthma, respiratory infection, inflammation of the joints of the breast bone or ribs.
- Because symptoms of DVT and PE can mimic these conditions, a wrong or delayed diagnosis can occur in patients who eventually get diagnosed with DVT or PE.
Blood clotting is a normal, complex process that prevents excessive bleeding when a blood vessel is injured.

- Sometimes clots can form abnormally when:
  - the flow of blood in a vein slows
  - damage to a vein occurs
  - or the blood is more clotable

- Many factors can increase a person’s risk.
Factors which increase risk for developing DVT and PE

Immobility:
- Hospitalization: A major risk factor
- Prolonged sitting: Long-distance travel, Sitting at a desk, Video games
Factors which increase risk for developing DVT and PE

Immobility:
- Hospitalization
- Prolonged sitting

Surgery and Trauma:
- Major surgery (pelvis, abdomen, hip, knee)
- Bone fracture or cast
- Catheter in a big vein

Some procedures are known to have higher clot risk
Factors which increase risk for developing DVT and PE

<table>
<thead>
<tr>
<th>Immobility:</th>
<th>Surgery and Trauma:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hospitalization</td>
<td>• Major surgery (pelvis, abdomen, hip, knee)</td>
</tr>
<tr>
<td>• Prolonged sitting</td>
<td>• Bone fracture or cast</td>
</tr>
<tr>
<td></td>
<td>• Catheter in a big vein</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increased estrogen:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Birth control pills, patches, rings</td>
<td></td>
</tr>
<tr>
<td>• Pregnancy, for up to 12 weeks after giving birth</td>
<td></td>
</tr>
<tr>
<td>• Hormone replacement therapy</td>
<td></td>
</tr>
</tbody>
</table>

PE: a leading cause of maternal death in the US
Factors which increase risk for developing DVT and PE

**Immobility:**
- Hospitalization
- Prolonged sitting

**Surgery and Trauma:**
- Major surgery (pelvis, abdomen, hip, knee)
- Bone fracture or cast
- Catheter in a big vein

**Increased estrogen:**
- Birth control pills, patches, rings
- Pregnancy, for up to 12 weeks after giving birth
- Hormone replacement therapy

**Medical conditions:**
- Cancer and its treatment
- Heart failure
- Inflammatory disorders (lupus, rheumatoid arthritis, inflammatory bowel disease)
- The kidney disorder called nephrotic syndrome
Factors which increase risk for developing DVT and PE

**Immobility:**
- Hospitalization
- Prolonged sitting

**Surgery and Trauma:**
- Major surgery (pelvis, abdomen, hip, knee)
- Bone fracture or cast
- Catheter in a big vein

**Increased estrogen:**
- Birth control pills, patches, rings
- Pregnancy, for up to 12 weeks after giving birth
- Hormone replacement therapy

**Medical conditions:**
- Cancer and its treatment
- Heart failure
- Inflammatory disorders (lupus, rheumatoid arthritis, inflammatory bowel disease)
- The kidney disorder called nephrotic syndrome

**Other risk factors:**
- Previous blood clot
- Family history of clots
- Clotting disorder (thrombophilia)
- Obesity
- Smoking
- Older age
Diagnosis of DVT and PE

Possible tests may include:

**Blood tests**
- **D-dimer** - can be used to rule out clot, but cannot by itself confirm clot

**Imaging studies**
- **DVT:** Doppler ultrasound, contrast venogram, MRI, CT
- **PE:** CT scan, V/Q scan, pulmonary angiography
Treatment of DVT and PE

- Treatment of DVT and PE are similar.

- Goals of treatment are:
  - To prevent an existing clot from growing in size
  - To prevent the formation of new clots
  - To prevent a DVT from breaking off, traveling through the blood stream and becoming a PE
  - To prevent or minimize long-term complications

- Primary treatment is anticoagulant medication, sometimes referred to as a ‘blood thinner’.
  - Increase the time it takes for blood to clot.
  - Prevent new clots from growing larger.
  - Anticoagulants do not dissolve a clot. Over time, the body absorbs the clot.
DVT and PE can happen to anyone, at any age

My experience:

- Diagnosed with DVT and PE
- 2003, 34 years old
- Excellent health, no medical issues

Mike, Beth & Evan Waldron
My story: Symptoms mimic other conditions

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Initial diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leg pain</td>
<td>“pulled muscle”</td>
</tr>
<tr>
<td>Chest pain+</td>
<td>“respiratory infection” - prescribed antibiotics</td>
</tr>
<tr>
<td>Rapid heart rate+</td>
<td></td>
</tr>
<tr>
<td>Shortness of breath</td>
<td></td>
</tr>
</tbody>
</table>

Symptoms of DVT and PE can mimic other less serious conditions, delaying accurate diagnosis and prompt treatment.
**My story: Outcome**

**Why did I develop DVT and PE?**

**Risk factors:**
- Oral contraceptives
- Genetic thrombophilia (clotting disorder)
  - *homozygous Factor V Leiden mutation*
- ???

**Today:**
- Long-term blood thinner (anticoagulant) therapy
- No new clots
- Lifelong worry of another clot
- Worry of bleeding on blood thinner
- Motivated to prevent and reduce burden of DVT and PE and to educate patients who develop a DVT or PE.
Prevention Tips

✓ Stay active
  ✓ Get up and move when sitting for a prolong period of time—travel, working at a desk, playing video games.
  ✓ After illness or surgery, the sooner you get out of bed and move, the better. Ask your doctor when it is ok for activity if you are unsure.

✓ Adopt a healthy lifestyle
  ✓ Avoid being sedentary
  ✓ Maintain an ideal body weight
  ✓ Don’t smoke
  ✓ Get regular check-ups and prevent/manage health conditions which are tied to increased DVT risk (cancer, heart disease....)
Prevention tips (continued)

- Know the signs and symptoms of DVT and PE
  - Do not delay seeking medical care

- Know your risk factors for developing DVT.
  - Discuss these with your doctor.

- Know your family medical history.
  - Make sure your doctor knows about a family history of DVT or PE
If you are hospitalized or planning for surgery, ask your doctor: ‘What will be done to prevent blood clots?’

✓ You may be given a blood thinning medication (anticoagulant) or special stockings designed to prevent blood clots. These blood clot prevention measures are called 'DVT prophylaxis'.

✓ If you are prescribed a blood thinning medication (anticoagulant) to take at home before or after hospitalization/surgery, make sure you take it exactly as instructed. Report any unusual bleeding or bruising.
Resources to learn more about DVT and PE

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC</td>
<td><a href="http://www.cdc.gov/ncbddd/dvt">www.cdc.gov/ncbddd/dvt</a></td>
</tr>
<tr>
<td>Clot Connect</td>
<td><a href="http://www.ClotConnect.org">www.ClotConnect.org</a></td>
</tr>
<tr>
<td>National Blood Clot Alliance</td>
<td><a href="http://www.StopTheClot.org">www.StopTheClot.org</a></td>
</tr>
<tr>
<td>This is Serious</td>
<td><a href="http://www.ThisIsSerious.org">www.ThisIsSerious.org</a></td>
</tr>
</tbody>
</table>
Questions?

Contact information:

Beth Waldron

bwaldron@med.unc.edu

www.ClotConnect.org
Archived webinar:
This webinar will be archived and the content will soon be available at
the Division of Blood Disorders website at

Next webinar:
Please join us again April 3 at 2 pm EST
Guy Young, MD, director of the Hemostasis and Thrombosis Center at
Children’s Hospital Los Angeles, will present on “New Directions in
Hemophilia: Outcomes and Clinical Challenges.”

Questions:
If you have any questions about today’s presentation or the schedule
of topics, please contact Cynthia Sayers at cay1@cdc.gov.